THE
VETERINARY RECORD.

The Official Journal of the National Veterinary Medical Association of Great Britain and Ireland, Limited.

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888.

No. 50. DECEMBER 13, 1924. VOL. 4.

Anærobic Infections in Animals.

DISCUSSION ON PROFESSOR GAIGER'S PAPER.

MR. DALLING'S VIEWS.

Prior to the discussion on his paper, Professor Gaiger exhibited the series of lantern slides set out below. They were excellently reproduced and were followed closely and with great interest. The list of slides is as follows :—

1. *Vibrion septique* on the peritoneum showing filament formation, in culture, and shewing flagella.
2. *Bacillus welchii* in culture.
3. *Bacillus chauvæi* in culture, and in a muscle smear.
4. *Bacillus ædematiens* in a muscle smear and on the serous membranes of a guinea-pig.
5. *Bacillus histolyticus* in culture, and in a muscle smear from a guinea-pig.
6. *Bacillus tetani* from a wound scraping.
7. Surface culture of *Vibrion septique* on serum agar.
8. Surface culture of *Bacillus welchii* on blood agar.
9. Deep culture of *Vibrion septique* in glucose agar.
10. Deep culture of *Bacillus welchii* in glucose agar.
11. Deep culture of *B. histolyticus* in glucose agar.
12. Deep culture of *B. sporogenes* in glucose agar.
13. Horse with *Vibrion septique* infection.
14. Horse with *B. histolyticus* and *B. ædematiens* infection.
15. Braxy stomach. Shewing the area of inflammation constantly present, being the place of penetration of the *Vibrion septique*.
16. Braxy stomach section ×30. Shewing engorgement of the blood vessels of the mucosa, necrosis of the surface of the mucosa, migration of leucocytes, sub-mucous connective tissue showing indistinct staining.
17. Braxy stomach, section ×50.
18. Braxy stomach, section ×30. Shewing engorged mucosa vessels, a heavy zone of migrated leucocytes, necrosis of the mucosa superficially, and the sub-mucous connective tissue indistinct. The zone of leucocytes does not border an infarct.
19. Normal sheeps' stomach section. Shewing the differences from the last three.
20. Braxy stomach section. Shewing the *Vibrion septique* in a small cluster surrounded by migrated leucocytes.
21. Braxy stomach section. Shewing the same under a higher power.
22. Braxy stomach section. Under a high power to show the bacillus sporulating in the stomach wall.
23. Braxy stomach section. Shewing that where large numbers of the bacilli are present the leucocytes have been overcome, and are few in numbers. The masses of bacilli have a felt-like appearance.
24. Same under a higher power.
25. Braxy bacillus commencing to form filaments on the peritoneum of a guinea-pig.
26. Braxy bacillus in diagram to show the arrangement of flagella.
27. The flagella of *B. typhosus* for comparison shewing the tresses of flagella, such as are not seen in the braxy bacillus.
28. Braxy stomach section. Shewing a place where severe inflammation has resulted in hæmorrhage into the mucosa and submucosa. This slide shows that nothing resembling an infarct is produced by a hæmorrhage, nor are leucocytes seen to be attacking the hæmorrhagic area as has been erroneously suggested.
29. Braxy stomach section. Shewing a hæmorrhagic area under a high power to show how the masses of red blood corpuscles do not kill the tissue cells of the stomach wall to form an infarct. The nuclei of the stomach wall tissue are seen taking the stain normally.
30. Lamb Dysentery. Ulcers in the small intestine.
31. Lamb Dysentery. Ulcer under a low power of the microscope. Shewing necrosis.
32. Lamb Dysentery. Ulcer tissue under a high-power shewing the *B.welchii*, one of the secondary organisms of the disease.
33. Lamb Dysentery. Masses of intestines adherent to each other and to the wall of the abdomen.
34. Table shewing anti-*Bacillus chauvæi* serum does not protect guinea-pigs against the *Vibrion septique*.

MR. T. DALLING opened the discussion on Professor Gaiger's paper with a thoroughly comprehensive

address, which was also illustrated by excellent lantern slides. He said :—

When Mr. Gaiger invited me to open the discussion on his paper, I gladly accepted the invitation, because I felt sure that he would bring forward material of the greatest interest to all branches of the profession and that he would lay before us some of his own findings in his researches into animal diseases. I felt also, having been associated with him for nearly four years in much of his work on anærobes, that his writings would prove abundantly full of useful knowledge, both to the practitioner and to men who, like myself, are engaged in the laboratory aspect of disease questions. My expectations have been fully realised. In bringing forward this paper, Mr. Gaiger has done a very great service to the Veterinary Profession in that he has condensed for us into a work of readable size, practically all that has been written by workers in all parts of the world on the part played by anærobes in the causation of animal diseases. There is nothing more fatiguing than the hunting up of articles one has read on some special subject, and one can readily realise the immense task Mr. Gaiger imposed on himself when he set out to study the various articles on anærobes found in practically all medical and veterinary scientific journals and to condense them into such a small compact space, keeping the essentials always in the foreground. And not only has he given us the findings of others, he has included much of his own work, some of which has been subjected to the severest of criticism in the past, but which, by his results in the field, has been clearly shown to have been in the right direction. Again he supplies us with an excellent list of references at the end of his paper, so that we can at a glance find the various articles on his subject should we wish to consult them in detail : for this alone we are deeply indebted to him, for all laboratory workers are keen to have a full list of references to articles on the problems upon which they are engaged.

The subject of anærobic infections of animals is one brimful of points for discussion : I should like to limit my remarks to three items, all referred to in this paper. They are :—

(1) Organisms associated with Blackquarter and immunisation against them.
(2) The association of *B. welchii* with animal diseases, with special reference to lamb dysentery.
(3) Some general debatable points.

Organisms associated with Blackquarter, and Immunisation against them.

That Blackquarter is the result of the action of more than one organism is becoming more apparent as time progresses and as the results of various bits of research come to light. Undoubtedly the similarity between *B. chauvœi* and the *Vibrion septique* has led to much confusion in the identity of the organism found in the muscle lesion, but now that we have a clear conception of the differences between the two, and now that we understand what a pure culture of an anærobe really is, it becomes more and more apparent that *Vibrion septique* has been labelled *B. chauvœi* on many occasions or that so-called pure cultures of *B. chauvœi* were really mixtures of that organism and others.

It has been our privilege to examine some strains of so-called *B. chauvœi* isolated from Rauschbrand (Blackquarter) cases by Continental workers and from which agents used in the immunisation against that disease have been made and used. Of eighteen such cultures examined, only two have been identified as *B. chauvœi* : fifteen were pure cultures of *Vibrion septique* and one was a pure culture of *B. histolyticus*. It will thus be evident that, on the Continent, at least, organisms other than *B. chauvœi*, notably the *Vibrion septique*, are found in pure culture in association with Blackquarter lesions.

From American laboratories we have received three cultures of *B. chauvœi*, all of which we have been able to confirm as pure cultures of that organism.

It may be of interest here to state briefly our procedure in the identifying of anærobic cultures. When a culture is received or isolated, it is examined microscopically for evidence of obvious contamination. If the organism be a sporing one, sporulation is encouraged by growth on meat containing media, and capillary tubes filled with the sporulating medium are heated at 80°C. for twenty minutes in an endeavour to kill off all vegetative forms, leaving the spores viable for further work. Cultures made from the heated material are used for colony production work, both on the surface and in the depth of solid media. Personally, I greatly prefer the surface colony method, using blood agar as a medium and a direct stream of hydrogen as a means to create efficient anærobiosis. Individual colonies are picked off and cultures from them are subjected to further plating after growth in different media, *e.g.*, milk, alkaline, egg, etc. This plating is continued till we are reasonably sure that a pure culture is present. Sugar fermentation tests are now carried out and noted. Guinea-pigs are inoculated intramuscularly with the now so-called " pure " culture and the post-mortem effects studied. Cultures are filtered and the toxicity in guinea-pigs and mice observed. Lastly, guinea-pigs are protected with the various anærobe anti-sera, and several M.L.D.'s. of the culture are inoculated. By such means one is fairly safe in concluding which anærobe one is dealing with and whether one or more types are present.

Mr. Gaiger has pointed out that the lesions produced in sheep by artificial inoculation with cultures of *B. chauvœi* and *Vibrion septique* are identical. I agree with this, and it would not be unreasonable to expect to find *Vibrion septique* as a cause of Blackquarter in cattle and sheep in this country. We have received samples of muscle taken from cattle dead of Blackquarter from eight different districts in Britain and have been able in each case to isolate *B. chauvœi*, but never *Vibrion septique*. However, eight is a small number from which to make any deductions, and we live in the hope of receiving many more samples from veterinary practitioners, from which we can examine and draw conclusions. Bosworth

and Allen state that in one case out of six they have been able to demonstrate the presence of *Vibrion septique* in muscle from Blackquarter.

There always exists an element of doubt in my mind as to the part played by *Vibrion septique* isolated along with other ærobes and anærobes from any tissue which may have been in contact with the soil, or from an animal which has lain dead for some time before the tissue was collected. One cannot lose sight of the fact that *Vibrion septique*, as Mr. Gaiger and others have found, is present in the soil in most parts, is a constant inhabitant of the alimentary tract of most herbivora, and penetrates into the tissues of the animal with other organisms soon after death: thus, the isolating of *Vibrion septique* from the tissues of a dead animal or from a tissue (*e.g.*, muscle) that has come in contact with soil is of little consequence. It will require careful work still before we can state definitely that *Vibrion septique* is the cause of Blackquarter in a proportion of the cases found in cattle and sheep in this country. From Continental work, however, we must regard it as a likely cause, and hence, in immunising animals against the disease, immunity should be produced against both organisms.

Immunisation.

Considerable attention has been given to the use of filtrates of anærobes in the production of immunity against disease and during the last year or so many experiments have been carried out at the Wellcome Physiological Research Laboratories on the subject. Bosworth and Allen have just published the results of some of this work, with the latter part of which I was associated. It may interest you to hear of some of this work.

Protection against B. chauvæi.

We have not been able to obtain a filtrate from *B. chauvæi* toxic for mice or guinea-pigs. Mice will withstand up to 1 c.c. of any of our filtrates intravenously, and no dose we have given to guinea-pigs has ever had the slightest toxic effect.

Many experiments have been carried out to show the period of growth required for the production of the best antigenic filtrate. It has been agreed that the filtrate from a four-day growth gives best results.

Protective Value of Filtrate in Guinea-pigs.

Table 1 shows that a single inoculation of 2·5 c.c. filtrate subcutaneously protected against one certain M.L.D. culture in 80 per cent. of cases, the time between the injections of the filtrate and culture being one month.

TABLE I.

Guinea-pig.	Filtrate.	Culture.	Result.
		(One month later).	
A	2·5 c.c.	0·5 c.c.	Lived.
		(One M.L.D.).	
B	,,	,,	Lived.
C	,,	,,	Lived.
D	,,	,,	Dead 48 hours.
E	,,	,,	Lived.
F	,,	,,	Lived.
G	,,	,,	Lived.

TABLE I. (*continued*).

Guinea-pig.	Filtrate.	Culture.	Result.
		(One month later).	
H	2·5 c.c.	0·5 c.c.	Dead 48 hours.
		(One M.L.D.).	
J.	,,	,,	Lived.
K	Nil	,,	Dead overnight.
L	Nil	,,	Dead overnight.
M	Nil	,,	Dead overnight.
N	Nil	,,	Dead overnight.

A higher degree of immunity has been produced by giving two inoculations at a month's interval, when 100 per cent. protection was got. This is shown in Table II.

TABLE II.

Guinea-pig.	1st inoc.	2nd inoc. (1 month later).	Culture. (14 days later).	Results.
A	2 c.c. filtrate	2 c.c. filtrate	0.5 c.c. (1 M.L.D.)	Lived
B	,,	,,	,,	Lived.
C	,,	,,	,,	Lived.
D	,,	,,	,,	Lived.
E	Nil	Nil	,,	Dead o.n.
F	Nil	Nil	,,	Dead o.n.
G	Nil	Nil	,,	Dead o.n.
H	Nil	Nil	,,	Dead o.n.

Protective Value of Filtrate in Sheep.

Four sheep received two inoculations of 5 c.c. *B. chauvæi* filtrate at a fortnight's interval. Each received 3 c.c. culture *B. chauvæi* at varying times up to seven months after the second inoculation; all survived the test, while two sheep which had received no protection died in twenty-four to thirty hours after receiving the same dose of culture.

Thus it can be confidently stated that the filtrate of *B. chauvæi* has a marked antigenic value.

Protection against Vibrion septique.

Vibrion septique in young cultures produces a highly potent toxin. The toxicity can readily be shown by injecting the filtrate intravenously into mice or guinea-pigs. Table III. shows the results in mice; Table IV. the results in guinea-pigs.

TABLE III.

Mouse.	Dose of Toxin.	Results.
A	0·25 c.c.	+ 3 mins.
B	0·25 c.c.	+ 2 mins.
C	0·1 c.c.	+ 5 mins.
D	0·1 c.c.	+ 4 mins.
E	0·05 c.c.	+ 55 mins.
F	0·05 c.c.	+ 55 mins.
G	0.025 c.c.	+130 mins.
H	0.025 c.c.	+114 mins.
J	0·01 c.c.	+ 48 hrs. approx.
K	0·01 c.c.	+ 24 hrs. approx.
L	0·005 c.c.	+ 72 hrs. approx.
M	0·005 c.c.	+ 72 hrs. approx.
N	0·0025 c.c.	—
O	0·0025 c.c.	—
P	0·001 c.c.	—
Q	0·001 c.c.	—

+ = died. — = survived.

TABLE IV.

Guinea-pigs.	Dose of Toxin.	Results.
A	0·25 c.c.	+ 6 mins.
B	0·2 c.c.	+ 7 mins.
C	0·15 c.c.	+ 63 mins.
D	0·1 c.c.	+ 21mins.
E	0.09 c.c.	+ 82 mins.
F	0.08 c.c.	+145 mins.
G	0.07 c.c.	+150 mins.
H	0·06 c.c.	+ 5 hrs.
J	0·05 c.c.	+ o.n.
K	0·04 c.c.	—
L	0·03 c.c.	—

It was found that the use of a pure toxic filtrate produced necrotic lesions in guinea-pigs and marked local œdema in sheep on inoculation, hence a mixture of toxin and antitoxin was used for immunising purposes—a 25 per cent. under neutralised toxin giving good results. Table V. shows how such neutralisation is carried out. The smallest dose of antitoxin that will protect against a certain lethal dose of the toxin is taken as the neutralising dose of toxin. By calculation the amount of antitoxin required to neutralise the amount in a given batch of toxin is ascertained. 25 per cent. of this amount is added to the batch.

TABLE V.

Mouse.	Toxin.	Anti-toxin.	Result.
A	·5 c.c.	——	+ 3 mins.
B	·5 c.c.	——	+ 5 mins.
C	·25 c.c.	——	+ 5 mins.
D	·25 c.c.	——	+ 7 mins.
E	·25 c.c.	·003 c.c.	+ 3 mins.
F	·5 c.c.	·006 c.c.	+ 6 mins.
G	·5 c.c.	·012 c.c.	+ o.n.
H	·5 c.c.	·025 c.c.	—
J	·5 c.c.	·05 c.c.	—
K	·5 c.c.	1 c.c.	—

It has also been ascertained that the filtrate from a forty-eight hour culture is of good antigenic value.

Protective Value of Mixture in Guinea-pigs.

Table VI. shows that one inoculation of a *Vibrion septique* mixture produces a certain degree of immunity only, while Table VII. shows that a double inoculation adds greatly to the amount of immunity produced.

TABLE VI.

Guinea-pig.	V.S. Mixture.	V.S. Toxin (Intravenously).	Result.
A	2 c.c.	·25 c.c.	Lived.
B	2 c.c.	·25 c.c.	Lived.
C	2 c.c.	·25 c.c.	Died 48 hrs.
D	2 c.c.	·25 c.c.	Died 1 hr.
E	——	·1 c.c.	Died 5 hrs.
F	——	·1 c.c.	Died 13 mins.

Toxin injected a fortnight after mixture.

TABLE VII.

Guinea-pig.	1st inoc.	2nd inoc.	Culture.	Result.
A	2 c.c.	2 c.c.	·05 c.c.	Lived
B	2 c.c.	2 c.c.	·05 c.c.	Lived.
C	2 c.c.	2 c.c.	·05 c.c.	Lived.
D	2 c.c.	2 c.c.	·05 c.c.	Lived.
E	2 c.c.	2 c.c.	·05 c.c.	Lived.
F	——	——	·05 c.c.	Dead 24 hrs.
G	——	——	·05 c.c.	Dead 24 hrs.

Protective Value of Filtrate in Sheep.

It has been shown conclusively that one dose of mixture fails to protect sheep against a lethal dose of *Vibrion septique* culture, but that a double inoculation given at intervals up to two months leaves the animals immune when tested up to six months after the second inoculation.

Immunity to B. chauvœi and Vibrion septique in the same animal.

It has been shown that by a simultaneous inoculation of *B. chauvœi* filtrate and *Vibrion septique* toxin (antitoxin mixture) guinea-pigs and sheep are rendered immune to inoculations of both organisms. The following is a summary of one experiment. Sheep A, B, C, D, and E all received a subcutaneous inoculation of 5 c.c. *B. chauvœi* filtrate and 5 c.c. 25 per cent. underneutralised *Vibrion septique* filtrate.

Two months later the dose was repeated. A and B received 3 c.c. *B. chauvœi* culture one month after the second inoculation and 4 c.c. *Vibrion septique* three weeks later. All survived. C, D, and E received 4 c.c. *Vibrion septique* three months after the second inoculation, and 3 c.c. *B. chauvœi* five months later. All survived. With each cultural test, control sheep were used, and all died in twenty-four hours to thirty-six hours. Thus it is very obvious that sheep at any rate can be immunised against both *B. chauvœi* and *Vibrion septique*, and, in the light of our present day knowledge, any preparation used for the protection of animals against Blackquarter should be one that will immunise against both organisms. Filtrates of the one and an underneutralised mixture of the other appear to give rise to a high degree of protection.

The Association of B. welchii with Animal Diseases with special reference to Lamb Dysentery.

Whether *B. welchii* actually causes disease in animals has never been ascertained satisfactorily. That it is found present in the tissues of diseased animals is well known, and Mr. Gaiger enumerates examples of where various workers have found it, including results of work done in the A.D.R.A. laboratory. Nakamura, in the *Japanese Journal of Veterinary Science*, June, 1922, records an outbreak of diarrhœa in young chicks with fatal results, from cases of which he isolated an organism closely resembling *B. welchii*, except in its fermentation action

on mannite, and with cultures of which he was able to reproduce the disease. Personally, I have isolated *B. welchii* from the brain substance of sheep killed while suffering from trembling, as quoted by Mr. Gaiger, and since then have isolated it from the brain substance of one dog killed while affected with chorea following distemper, and from the same tissue of one sheep destroyed while affected with a disease presenting acute nervous symptoms—a disease peculiar to ewes to the Herdwick breed and affecting them at or immediately after lambing. Further, a culture taken from a human source came into my hands the other day, having been isolated from the blood during life. It remains for further research to show the true part played by this organism in animal diseases, but one cannot but hold that a pathogenic anærobe found in nervous structures in the course of disease presenting nervous symptoms plays more than a secondary part. These organisms I have isolated from the brain substances of these various animals are highly pathogenic, when cultured and inoculated into guinea-pigs. I have no proof to offer to show that the organism plays more than a very secondary part, but one cannot but feel that research may ultimately show that some considerable importance must be attached to its presence there.

I agree that spores of *B. welchii* are difficult to find in artificial culture, and though I have tried to encourage sporulation on all the various mediums recognised as good for that purpose, I do not think I have seen more than six spores during all my work. It is evident, however, that cultures of *B. welchii*, grown on a medium containing meat, become resistant to heat, for in attempting to isolate cultures from a mixture I have been able to heat such meat cultures for fifteen minutes at 80° C., and recover cultures of *B. welchii*. Spores may be demonstrated by the incubation of the whole carcase of a guinea-pig dead from a *B. welchii* infection.

The organism produces a fairly potent toxin in young cultures. I usually work with a culture grown 12—15 hours at 37° C., for the production of the best toxin. In my experience the toxin is not stable, and if kept even in an ice room it is quickly reduced in potency. To test the toxicity of *B. welchii* filtrate we use mice, inoculating them intravenously. An example of such a test is given in Table VIII.

TABLE VIII.

Mouse.	Toxin.	Result.
1	0·25 c.c.	+ overnight.
2	0·25 c.c.	+ overnight.
3	0·1 c.c.	+ overnight.
4	0·1 c.c.	+ overnight.
5	0·05 c.c.	+ 36 hours.
6	0·05 c.c.	+ 36 hours.
7	0·025c.c.	+ 36 hours.
8	0·025c.c.	–
9	0·01 c.c.	–
10	0·01 c.c.	–

\+ = Died. – = Lived.

During our work on lamb dysentery, we made an anti-toxin for *B. welchii*, and the occasion arose to test serum of normal horses for the presence of such anti-toxin in the hope of finding one with an appreciable quantity and which, therefore, could be immunised rapidly. The intradermic test was carried out on guinea-pigs, using a mixture of toxin and horse serum. The toxin produces a circular raised swelling which in time becomes necrotic and sloughs. A mixture of anti-toxin and toxin fails to produce such a lesion. Table IX. shows the results of intradermic injections of mixtures of a known toxin and normal horse sera.

TABLE IX.

Toxin.	Serum.	Result.
0·025c.c.	——	+
0·05 c.c.	——	+
0·025c.c.	0·1 c.c. H.1380	+
0·05 c.c.	0·1 c.c. H.1380	+
0·025c.c.	0·1 c.c. H.1440	+
0·05 c.c.	0·1 c.c. H.1440	+
0·025c.c.	0·1 c.c. H.1305	–
0·05 c.c.	0·1 c.c. H.1305	–
0·025c.c.	0·1 c.c. H.1413	–
0·05 c.c.	0·1 c.c. H.1413	–
0·025c.c.	0·1 c.c. H.1108	–
0·05 c.c.	0·1 c.c. H.1108	?
0·025c.c.	0·1 c.c. H.1471	–
0·05 c.c.	0·1 c.c. H.1471	–

From the six horses' serum tested, three proved to contain anti-toxin and a fourth may have had a trace. Horse H.1471 was further tested, this time using mice for the test. Table X. shows that 0·1 c.c. of the serum protected against 0·1 c.c. toxin—a certain M.L.D.

TABLE X.

Mouse.	Toxin.	Serum.	Result.
1	0·5 c.c.	——	Dead 2 hours.
2	0·5 c.c.	——	Dead 2 hours.
3	0·25 c.c.	——	Dead overnight.
4	0·25 c.c.	——	Dead overnight.
5	0·1 c.c.	——	Dead overnight.
6	0·1 c.c.	——	Dead overnight.
7	0·5 c.c.	0·25 c.c.	Dead overnight.
8	0·5 c.c.	0·25 c.c.	Dead overnight.
9	0·5 c.c.	0·1 c.c.	Dead overnight.
10	0·5 c.c.	0·1 c.c.	Dead overnight.
11	0·25 c.c.	0·25 c.c.	Dead overnight.
12	0·25 c.c.	0·25 c.c.	Dead overnight.
13	0·25 c.c.	0·1 c.c.	Dead overnight.
14	0·25 c.c.	0·1 c.c.	Dead overnight.
15	0·1 c.c.	0·25 c.c.	–
16	0·1 c.c.	0·25 c.c.	–
17	0·1 c.c.	0·1 c.c.	–
18	0·1 c.c.	0·1 c.c.	–

In the production of the anti-toxin for use on lambs, Horse H.1471 was used, and readily produced an anti-toxin of high protective value, 0·005 c.c. protecting against 0.5 c.c. toxin, i.e., it had increased 100 times. Table XI. shows the titration at this period.

TABLE XI.

Mouse.	Toxin.	Serum.	Result.
1	0·5 c.c.	0·1 c.c.	–
2	,,	0·1 c.c.	–
3	,,	0·05 c.c.	–
4	,,	0·05 c.c.	–
5	,,	0·025 c.c.	–
6	,,	0·025 c.c.	–
7	,,	0·01 c.c.	–
8	,,	0·01 c.c.	–
9	,,	0·005 c.c.	–
10	,,	0·005 c.c.	–
11	,,	0·0025c.c.	Dead overnight.
12	,,	0·0025c.c.	Dead overnight.
13	,,	0·001 c.c.	Dead overnight.
14	,,	0·001 c.c.	Dead overnight.

Mr. Gaiger has told us that *B. welchii* is found in association with lamb disease, but I feel that he does not attach the importance to it that it warrants. I may say here that I have failed to isolate the *Vibrion septique* from any organ of the body in lamb disease, and other than present in the intestine in such cases I have not met it. It may be that I have not done a sufficient number of cases, but in practically every case I have examined I have been able to identify *B. welchii*, usually associated with *B. coli*, and sometimes with a diplococcus. I have, however, this season been able to examine under satisfactory conditions six lambs in various stages of the disease. Four lambs were dealt with in a veterinary surgeon's surgery, and two were able to be taken alive from the North of England to our laboratory in the South, and there killed in the laboratory. Specimens were taken with full aseptic precautions.

It will make an interesting study to observe the effect of feeding healthy lambs on cultures of *Vibrion septique* or mixtures. During the past season I was privileged to conduct some feeding experiments on a farm where the disease is unknown. Prior to carrying out these feeding tests, some were done at the laboratory. Table XII. gives the results showing that it required a mixture of *B. coli* and *B. welchii* to reproduce the disease.

TABLE XII.

Lamb.	*B.coli.*	*B.welchii.*	Result.
A	50 c.c.	——	–
B	——	50 c.c.	–
C	20 c.c.	20 c.c.	Dead 48 hours.
D	10 c.c.	10 c.c.	Dead 48 hours.
E	50 c.c.	50 c.c.	Dead overnight.
F	20 c.c.	10 c.c.	Dead 3 days.

The reproduction of the disease in the field could not be brought about by similar feeding so long as one left the lamb with its mother. Removal from its mother, and feeding on cow milk or withholding all milk had the desired result. Table XIII. will show these results.

TABLE XIII.

Group A (Lambs outside) fed on :—

(1)	Normal ewe's milk ...	No result.
(2)	Cow's milk	No result.
(3)	Infective ewe's milk ...	No result.
(4)	All milk withheld ...	Died of lamb disease.

Group B (Lambs kept inside building) fed on :—

(1)	Normal ewe's milk ...	No result.
(2)	Cow's milk	Died of lamb disease.
(3)	Infective ewe's milk ...	Died of lamb disease.

A very big question is opened up as to the part played by the ewe and her milk in the production or of protection from the disease—a question that will have to wait till next season for further study.

Mr. Gaiger says "that *B. welchii* is not of primary etiological importance in this disease is indicated by the fact that an anti-serum for this organism does not seem to have an influence in stopping the onset of a natural attack." I do not for a moment suggest that every case of lamb dysentery will be prevented by the use of a *B. welchii* antitoxin, nor have I many figures to bring forward to say it will lessen the occurrence of the disease. I also know that in some districts where such a serum was used there was little differrence in the results between the inoculated and control uninoculated death rate, but on one farm in Scotland where 390 lambs were inoculated thirty died of lamb dysentery, while of the seventy-five lambs kept as controls under exactly similar conditions, and at the same time, thirty also died, giving death rates of 10 per cent. and 40 per cent. respectively. The inoculated lambs here had one inoculation only of a pure welchii antitoxin. The farmer says "the uninoculated lambs mostly died at two or three days' old, or, anyhow, at less than a week; no inoculated lambs died before nine days from the date of their inoculation."

Further tests were carried out last year using a mixture of *B. welchii* antitoxin and *B. coli* antiserum on lambs soon after birth, and repeating it each week for three weeks. On one farm thirty lambs were done, and put into a reputedly bad field—two only died of the disease, while fourteen of the thirty control lambs developed lamb dysentery and died. I give the following experience for what it is worth. On an infected farm seven ewes only had to lamb, and as one knows the last ewes to lamb lose almost all their lambs. Six were inoculated with the double serum, but from pressure of work the last to be born was left undone. It was the only one of the seven that developed the disease and died. I still have hope of preparing material from *B. welchii* alone or from *B. welchii* and *B. coli* for use either on the ewe before lambing, or on the lamb soon after birth, to produce some immunity to this scourge.

SOME GENERAL DEBATABLE POINTS.

(*a*) *Media for the Cultivation of Anærobes.*

I agree with Mr. Gaiger that a medium containing liver extract is excellent for the growth of all anærobes, but I do not agree that even when freshly made it will start a culture of *B. chauvæi* growing. If *B. chauvæi* has been kept in culture for some months without subculturing, a liver broth medium will not always produce a culture when inoculated. The medium giving best results in our experience is TAROZZI'S, a meat broth containing 1 per cent. glucose, to which has been added a small piece of uncooked sterile guinea-pig liver. The results are most gratifying.

(*b*) *Virulence of B. chauvæi.*

Mr. Gaiger states that *B. chauvæi* retains its virulence for years in artificial culture. I cannot agree with this statement, as our experience is exactly the reverse. Much time has been lost in some of our experimental work, because of the rapidity with which our cultures of *B. chauvæi* have lost their virulence. As an example of this let me quote the following:—

A meat broth culture of *B.chauvoei* killed guinea-pigs on intramuscular inoculation in doses of 0·3 c.c. in 24—48 hours. It had been left untouched in the same culture tube for six weeks, and on retesting for virulence was found to produce death only in doses of 3 c.c. By repeated passage it has been found possible to obtain a culture having the original lethal dose for guinea-pigs. Personally, I would feel very grateful if someone could give us some enlightenment on this point.

(*c*) *Suprarenal Reaction in Vibrion septique Infection.*

One reads commonly in text-books and articles describing guinea-pig infection with cultures of *Vibrion septique* that the suprarenals are hæmorrhagic. The veterinary department of our laboratory have *post-mortem* examinations on such guinea-pigs practically every day, and I cannot call to mind this feature. Possibly it only occurs in delayed deaths or in early deaths, but our experience does not show it to occur in animals which die overnight.

(*d*) *Filaments on Peritoneal Surface of the Liver.*

While I agree that the presence of filaments on the peritoneal surface of an injected guinea-pig's liver is of considerable service in the identification of *Vibrion septique*, I cannot confirm that it is absolutely diagnostic. While working with some commercial blackleg products from an antigenetic point of view many guinea-pigs had to be inoculated with the various samples. Some guinea-pigs died as a result of the inoculation, and in the case of one product filaments were present on all the dead guinea-pig livers. The organism isolated from these dead guinea-pigs is certainly not *Vibrion septique*, though giving the liver surface reaction.

(*e*) *'Reading' Bacillus.*

It was quite a pleasure to me to see a reference in the paper to the 'Reading' bacillus, as I feel to some extent responsible for its introduction to the veterinary profession, having used it and advocated its use during the war days in France. I am rather surprised that its use has not been more generally adopted in the treatment of wounds. Certainly it is not a pleasant dressing to use, but the satisfactory results accruing from its application in suitable cases amply justifies its use, and compensates for any disagreeable appearance or odour during the period of treatment. Given the suitable case—a deep discharging wound with unhealthy or dead tissue to be sloughed out—an application of the Reading bacillus culture will surely effect a change in the course of a day or two. Naturally, where dead bone, etc., is present it can do little, and I feel that failures recorded may be due in a large measure to its misuse.

(*f*) *Solid Paraffin in Liquid Media.*

Personally I do not adopt the solid paraffin method for the exclusion of air from liquid media. There always exists the risk of its shrinking from the edges of the culture tube, and therefore undoing its usefulness. There is also the difficulty of withdrawing any fluid for examination: the paraffin has to be melted and a pipette used. With liquid paraffin things are more satisfactory, as it is not at all essential to make use of a pipette for the withdrawal of fluid, for by tilting the tube the paraffin can usually be made to keep to the surface when the liquid exudes from below. But in the majority of anærobic mediums no surface seal seems necessary at all: this is especially so with a liver medium or one containing cooked or uncooked tissue.

(*g*) *Mc Intosh and Fildes' Jar.*

Mr. Gaiger describes a very elaborate sample of the McIntosh and Filde's jar used in the cultivation of anærobes. Certainly if one has such a jar, by all means use it, but to my mind some of the simpler forms are quite satisfactory. Nor do I think it necessary to evacuate the air with a vacuum pump before passing in the hydrogen. For the growth of anærobic colonies on the surface of solid media, the McIntosh and Filde's method has been advocated, using a capsule of palladiumised asbestos immediately within the rubber stopper at the mouth of a wide-necked bottle containing the medium. To my mind such a method is not essential—quite good results with many anærobes can be got by the use of a direct strong stream of sterile hydrogen for the displacement of the air.

(*h*) *Keeping Animals at Room Temperature before making a post-mortem.*

Referring to the recovery of *B. chauvæi* from inoculated guinea-pigs, Mr. Gaiger says: "If death has been rapid, cultures from the heart blood will be sterile, but if the dead guinea-pig is kept a few hours at room temperature, positive pure cultures may be obtained." Personally I regard the delay of the conducting of a *post-mortem* for bacteriological work as full of considerable risk because of the invasion of other organisms. This has been brought home to me very forcibly because of a little incident that occurred lately. Starting with a pure culture of *B. chauvæi*, one that has been used and tested for purity many times, I attempted to raise its virulence

by direct passage of guinea-pig muscle juice. Having used four animals in this way, taking the greatest precautions possible, a fifth died from a very small dose. On bacteriological examination of this subject, a mixture of organisms was obtained from the heart blood, including *Vibrion septique*. I account for this result by having left the fourth animal too long at room temperature before making the *post-mortem*.

(*i*) *Bacillus Botulinus.*

I should like to draw attention to one or two points under this heading contained in the paper. Mr. Gaiger quotes that Madsen's filtered toxin was fatal to guinea-pigs in a dose of 0·0015 c.c. An American strain of *B. botulinus* used in our laboratory produces a toxin when filtered that is fatal to guinea-pigs in a dose of 0·00001 c.c., which when given intraperitoneally produces death in 3—4 days. Larger doses prove fatal earlier.

It is also stated that "the toxin of *B. botulinus* is relatively stable." Toxins prepared by us have not this feature: there is a marked falling off in potency after keeping for seven days even in an ice room.

Cultures of *B. botulinus* have been injected subcutaneously and intraperitoneally into guinea-pigs by us with a view to its recovery from the tissues. We have never been able to obtain cultures from the heart blood, but have repeatedly been successful in growing cultures from the liver where actual pieces of the organ were inserted into the culture tube.

Feeding guinea-pigs by mouth with whole culture of *B. botulinus* has, in doses of 1 c.c., produced death in times varying from 18 hours to two days. On no occasion have we been able to recover the organism from any tissue of the dead fed animal.

I do not want to enter into a discussion on grass disease, and the relation between it and *B. botulinus*, but before I conclude I must make reference to two points.

Dr. Tocher's Organism.

It was only very recently that I knew there existed in our laboratories a culture of the organism isolated from the spleen of a case of grass disease by Dr. Tocher. I took the first opportunity of using it to feed guinea-pigs with. Four animals were fed with 1 c.c. of a 48 hours' culture—a pipette being used for the feeding. All four animals died in from 18—48 hours. If, as we are forced to believe, the only true diagnostic test for *B.botulinus* is that it shall be pathgenic by feeding, then the culture I used contains *B. botulinus*. I have had no time to do anything further with the culture yet. I have had the good fortune to be able to conduct some four *post-mortems* on grass disease cases, but never have I been able to isolate an organism in any way similar to *B.botulinus*.

B. botulinus Antitoxin in the Blood of Affected.

During the past few months I have been able to obtain samples of blood from three cases of grass disease. One was from a recovered case, and two from sub-acute cases which had been affected some six weeks.

The serum on being used in large doses failed to protect guinea-pigs against one M.L.D. of *B. botulinus* toxin. There was, therefore, no detectable antitoxin present.

With much of the experimental work on anærobes I have recorded, my colleague, Mr. H. R. Allen, M.R.C.V.S., has been associated.

In conclusion, let me once more say how deeply indebted I am personally to Mr. Gaiger for bringing forward this subject, for the manner in which he has dealt with it, and for the opportunity he has given me to express some opinions on anærobic infections of animals, and to place some of the results I have obtained before you.

Mr. TUDOR HUGHES: After the exhaustive and masterly opening to which we have just listened from Mr. Dalling, I do not desire to detain you, but I should just like to thank Professor Gaiger for the trouble he has taken in preparing the slides, and to make one suggestion, in this regard—as to the possible value of showing a section of the structure of the normal before showing the section of the abnormal. I was struck, on reading the paper, with the amount of gas evolved by these anærobes (loud laughter, in which Messrs. Dalling and Hughes heartily joined)—and whilst we are very interested as to what these organisms will grow in, and the characters they evince, as clinicians and practitioners we should like to know what they will not grow in; that is to say, what is the minimum concentration of the most suitable antiseptic to inhibit their growth. I think they account for the group of the most hopeless cases which we are called upon to treat. Concerning experimental inoculation, we have heard of a good many intravenous inoculations, and the question is, whether in experimental work the conditions of artificial inoculation should not conform to the conditions which prevail in the field. These anærobes are associated with conditions of rapid putrefaction, and there is thus a question whether their recognition would be of any value in forming a conclusion concerning the carcasses of those animals which are supposed to have died from lightning stroke.

Professor H. A. WOODRUFF: I want first of all to tender my congratulations to Professor Gaiger, not only for the excellence of his paper, but for the very high standard of work which lies behind the paper. I want to say one or two words about braxy. My predecessor in Melbourne, Professor Gilruth, did a lot of work on this disease in three different parts of Australasia—first in New Zealand, then in Tasmania, and lastly in Victoria. The point which I want to make is that the pathological factor of frost and cold has nothing to do with the production of the disease, as we see it in various conditions (those prevailing in the different districts in which Professor Gilruth worked) in Australia. In different parts of the world you may find one and the same disease arising with pathological secondary factors which give you very great differences both in symptomatology and *post-mortem* appearance. This is one of the reasons why the hæmorrhagic lesion in the fourth stomach is not, with us, so important a factor as it is with you. Since a secondary factor with us is drought, our braxy occurs at a different time. We have been hanging

fire in my own laboratory for some four years, hoping to have an outbreak—I speak from the point of view of the pathologist (laughter)—to furnish the material, and so far we are still waiting, but I am quite sure that when the opportunity does present itself, we shall apply Professor Gaiger's finding with very great interest. I wish to emphasise the importance in all our work upon the etiology of diseases of the class which we are now discussing, of securing our material, whenever possible, from the live subject, and, when this is not possible, from subjects which have had *post-mortem* examinations made upon them without loss of time.

It has been my privilege recently to spend some time in Jensen's laboratory, and in the High School at Copenhagen, and the organism with which they are working is this same organism with which Professor Gaiger is working.

With regard to the subject of *B. botulinus* infection, we find the disease in Australia in particular where there is a soil deficiency, especially in lime and phosphates, and we met with a disease which was often killing large numbers of cattle, and associated with this disease we found a habit of bone chewing to a peculiar degree. The cattle appear to absorb a toxic substance with the material ingested on sucking the bone, and we noticed a paralysis of deglutition. We have found that in the districts where this disease was prevalent, with the use of lime and superphosphates on the land it has become less and less frequent. I pay a tribute to my colleague, Dr. Seddon, for the work he has done on this subject. (Applause.)

PROFESSOR GAIGER'S REPLY.

Professor GAIGER, in reply, said: I do not want it to go out from this meeting that I in my way advocate *post-mortem* examination on dead animals. For years it has been a primary point that I have always insisted upon that you must get the animal in the live state, and get it some considerable time before you expect it to die. With regard to Mr. Dalling's points, I do not think there is anything upon which we disagree very seriously. I am extremely glad that Mr. Dalling has opened the discussion, because we have had the advantage of two papers instead of one. This point of the *Bacillus chauvœi* not retaining its virulence might be due to his media becoming too acid for his organism to survive for any length of time. He will have better results if he dries the muscle, and preserves the dried muscle. When I said that the botulinus toxin was stable, I meant that it was relatively stable compared with the unstable toxins formed by such organisms as the *Vibrion septique* and *B. welchii*.

It is news to me that the organism isolated by Dr. Tocher and kept at the Wellcome Research Laboratories, is killed by feeding. I cannot help thinking that there must be some mistake about this, because I think this is a claim which Dr. Tocher himself has never made for his organism. It is easy to get a tube wrongly labelled. (Laughter.) I quite agree with what was said about the necessity for laboratory experimentation being confirmed by field experiments. What we are waiting for in regard to braxy is an extremely bad year, so as to see what effect the vaccine against braxy has upon such conditions. It is very interesting to hear from Professor Woodruff that frost has no effect in New Zealand. The veterinary surgeon generally lays too much stress upon frost—the point is that anything that lowers the tone of the stomach may produce a case of braxy, if bacterial infection takes place. Professor Woodruff also spoke about the periodicity of the disease. We know that in this country that also occurs. The mortality from braxy is almost invariably rated too high by farmers. When you have actual observation you do not get a death rate in braxy of 30, 40, or 50 per cent.

There is no bone-eating habit in grass disease in horses. I can quite understand that, where the craving occurs for phosphorus, animals will eat bones, and in that way the toxigenic bacillus gains entrance, but these horses do not have the opportunity of getting bones.

The National Veterinary Medical Association of Great Britain and Ireland, Limited.

An Extraordinary General Meeting of the Association was held at 10 Red Lion Square, W.C.1, on Monday, the 8th day of December, 1924, at three o'clock.

In the absence of the President, Professor J. B. BUXTON was voted to the chair.

The SECRETARY read the notice convening the meeting. He than announced apologies from several members who were unable to be present.

The CHAIRMAN moved the following resolutions:—

(1) That it is desirable to reconstruct the Association, and accordingly that the Association be wound up voluntarily, and that Geoffrey Herbert Livesey, of 10 Gray's Inn Square, London, W.C.1, be hereby appointed Liquidator for the purposes of such winding-up.

(2) That the said Liquidator be hereby authorised to consent to the registration of a new Association, to be named "The National Veterinary Medical Association of Great Britain and Ireland," with a Memorandum and Articles of Association which have already been prepared with the privity and approval of the Council of this Association.

(3) That the draft Agreement submitted to this meeting, and expressed to be made between this Association and its Liquidator of the one part and the National Veterinary Medical Association of Great Britain and Ireland of the other part, be hereby approved, and that the said Liquidator be hereby authorised pursuant to Section 192 of the Companies (Consolidation) Act, 1908, to enter into an Agreement with such new Association (when incorporated) in the terms of the said draft, and to carry the same into effect with such (if any) modifications as they think expedient.

These resolutions were seconded by Mr. W. SHIPLEY, of Great Yarmouth, and were carried unanimously.

The CHAIRMAN announced that a Confirmatory Meeting would be held on Tuesday, 23rd December. This concluded the business of the meeting.

GEOFFREY H. LIVESEY,
General Secretary.

The Veterinary Record.

13th December, 1924.

Fourteenth Report of the Development Commissioners for the year ended 31st March, 1924.

For conciseness of report of a great State undertaking, it would be well nigh impossible to equal that of the Development Commissioners in their fourteenth report for the year ended 31st March, 1924, now available for purchase from any Government Stationery Office, or through any bookseller, at the cost of four shillings. The Commissioners also have every reason to be satisfied with the labour of their hand; the results which have accrued from the outlay of public money, and which are evidenced in the various subheadings of the report, are not only in themselves surprising, but they bear on their face the hall mark of true development. A careful perusal of the report will repay anyone who has the interests and progress of agricultural and veterinary science at heart: it certainly provides material for serious thought, and it serves to point the direction in which further progress can be effected for the common good of the State.

It will be remembered that the Development Commission was appointed under the Development and Roads Improvement Funds Act, 1909 and 1910, for the development of agriculture, rural economy, fisheries and harbours and for the judicious allocation of money voted by Parliament for that purpose. To meet the cost of maintaining schemes under this original fund, a sum of about £200,000 annually is necessary. In 1921, however, a Special Fund for promoting agricultural development was provided by the Corn Production Acts (Repeal) Act of that year, £850,000 being voted for England and Wales, and a sum of £150,000 being also paid into the Agriculture (Scotland) Fund for similar purposes in Scotland, such sums being calculated to last until March, 1927. The balance in hand of this Special Fund for England and Wales at the end of March, 1923, was £748,843, and at the end of March, 1924, it stood at £661,399. The money is used to extend work of a type aided by the original fund, and is therefore supplementary to that fund, though it cannot be used for all the purposes contemplated by the Development and Roads Improvement Funds Act, 1909. During the financial year 1923—24 the total sums recommended for expenditure amounted to the following:—

I.—For agriculture and rural industries	£387,219
II.—For fisheries and harbours (including £13,130 loan)	93,141
III.—For reclamation of land	321
	£480,681

By far the largest expenditure is in respect of agricultural research and education, and in certain measures for the better development of the countryside. During the year under review, the sums recommended for research and education amounted to £372,156, of which about £134,000 was in respect of the maintenance of research institutes of the different branches of agricultural science, and £41,773 for a parallel and complementary advisory service maintained at agricultural colleges and university departments of agriculture. In addition to the above, special research grants are made for limited periods to research workers; fellowships are given to enable the staffs of research and advisory services to travel and study methods of other research workers; scholarships are offered to promising young aspirants in research; financial aid is given for such educational purposes as the building and equipment of colleges, grants as a rule being £ for £ provided by such colleges; and, lastly, grants are made for a limited number of other schemes put forward by the departments of agriculture or by approved agencies for furthering the knowledge of agricultural science. In supporting justification of the expenditure under the above general headings, one cannot do better than quote the Commissioner's own words:—"So necessary is research to the healthy working of instruction in a subject like agriculture, firmly rooted as it has been in the traditions of the past, and now perplexed by the uncertainties of the present situation, that even if the direct returns alluded to above were non-existent, a case might be made for maintaining our research institutes and advisory centres in the interests of adequate training of the rising generation of farmers. These agencies form the most certain means of insuring that among the agriculturalists of the future there will be men with alert minds ready to adapt their practices to the needs of the time, to extract the most that can be got from our soils and to guide the action of their fellows.

"How important a matter agricultural research may be to the crowded population of this under-tilled country, determined to raise its own standard of living, but by no means clear either as to how it can market its own industrial products, or as to how it is to pay for its imported food, no one can now forecast. In the circumstances Your Lordships and the public may agree with us in thinking that, apart from the demands of the industry itself, the expenditure of a small share of the Nation's funds in promoting agricultural research is justified by way of an insurance policy."

The plan followed in the report dealing with the work of the various research institutes is to let the director of each institute speak for himself, and the condensed statements embodied are replete with valuable information on the many problems which confront agriculture and animal husbandry. With so many institutions conducting research relative to these problems, there may arise a certain amount of overlapping of work, but under systematic co-operation this can be, and is, got over and turned to profitable

account. Indeed, co-operation is at all times desirable, a qualified team ensuring effective study.

Space will only permit of a brief reference to the work carried out at the different institutes and experimental stations. One is much impressed with the large number of diseases in plant life occasioned by bacterial, fungoid, protozoal and insect agencies in similar fashion to the diseases affecting human and animal life, and the progress which has been made with regard to their investigation and scientific treatment. The knowledge shown carries a suggestion that when research into human and animal disease is projected, Councils appointed for the conduct of the same should invariably include a Plant Pathologist or Mycologist. The advantage of the association of plant pathologists in the elucidation of the causes of various diseases affecting animals and man was emphasised by Sir Clifford Albutt in his opening address of the Comparative Section of the Royal Society of Medicine last year.

From the purely veterinary aspect of the report, the Veterinary Profession appreciates the aid it has received in the furtherance of research into animal diseases by the provision of the institute of Animal Pathology at Cambridge University (grant for the year 1923—24, £15,000, plus maintenance, salaries and equipment, £8,912); the building of the Research Institute of Animal Pathology at the Royal Veterinary College, London (grants amounting to £31,500 for buildings and equipment, plus maintenance and salaries for 1923—24, £2,960); the approval of grants of £2,300 for the years 1923—24 and 1924—25 to the Scottish Animal Diseases Research Association; the inclusion of Veterinary Experts in the Scheme of Advisory Service; capital expenditure and maintenance grants up to 1924—25 of a total of £4,212 to the Ministry's Veterinary Laboratory, Addlestone for research into poultry diseases. And unquestionably each of these institutes and associations will render good and beneficial service to the State.

To secure real efficiency for veterinary service, however, a change, or rather an enlargement, of general policy in respect to the Veterinary Profession is necessary, and it is pardonable to draw attention to it in this review.

It will be noticed in the work carried out during the year at the Institute of Animal Pathology, Cambridge University, that the diseases under investigation chiefly related to sheep and pigs, the protection of young stock against infection by *B. chauvœi* and *Vibrion septique*, and the perfecting of the technique of the Tuberculin Test. At the Institute of Animal Pathology, Royal Veterinary College, London, work mainly concerned mastitis in cows and Johne's disease. The investigations initiated by the Scottish Animal Diseases Research Association, especially concerned sheep, though "grass disease" in horses was also dealt with. A grant of £10,000 was also sanctioned for the use of a Special Committee of Research into foot-and-mouth disease, the chief investigators for which being drawn mainly from outside the Veterinary Profession. Excepting, perhaps, as mastitis, no mention is made in the report of action in the gravest of all diseases affecting the health of animals in this country, and its serious bearing on the health of our human population, viz., tuberculosis in cattle, of which over one million dairy cows are estimated to be affected, and taking toll of over 10,000 lives of children annually from drinking tuberculous milk. Until this stain can be removed, it is somewhat idle to talk of research and the benefits of research to the community.

The defect—and it is one of organisation—is quite plain to see, and an opportunity is presented to the Development Commissions to supply a suitable remedy. The Veterinary Profession in the past has been left very much to its own resources, or has been forced to take a subordinate seat. In the matter of tuberculosis, its interests are divided between the Ministry of Health on the one hand, and the Ministry of Agriculture on the other, and between two stools the proper equilibrium is difficult to maintain. In research into animal diseases supreme confidence is not placed in its members—notably the Foot-and-Mouth Research Committee above mentioned, and research into canine distemper conducted under the auspices of the Medical Research Council (Ministry of Health)—and even the Advisory Committee on Agricultural Science, which embraces animal husbandry, the maintenance of the health of farm animals and control of their diseases, does not include a veterinary expert.

J. M.

VETERINARY SURGEON'S DISTRESSING DEATH.

"A singular story was," says the *Birmingham Post* of November 27th, "told at an inquest at Broadway on Tuesday regarding the death of William D. Lindsay, veterinary surgeon, formerly of Broadway, whose body was found in a covert on the top of Fish Hill after he had been missing for nearly seven months.

"Archibald Renfrew, veterinary surgeon, said that Lindsay had been in his employ for nearly sixteen years, and lived with him. On May 6th, at 9-15 a.m., he and his son had words with Lindsay regarding the latter taking orders from witness's son, and Lindsay left the house at 11-15 a.m. Witness heard no more of him until he was informed that the body had been found. He did not notify the police that Lindsay was missing, as he thought he had gone to his home in Edinburgh, and he did not know the address.

"In reply to the Coroner, witness said that Lindsay was in the habit of carrying prussic acid for the purpose of poisoning dogs.

"Corroborative evidence was given by Renfrew's son.

"The story of finding the body was told by Thomas Bates, labourer, of Broadway, who said that he came across it on Sunday at about five o'clock.

"Medical evidence was given to the effect that there was no indication that Lindsay had been poisoned. It looked as though he had simply laid down and died.

"The Coroner, in recording a verdict of 'Found dead,' expressed the opinion that Mr. Renfrew should have notified the police that Lindsay was missing so that enquiries might have been made."

CLINICAL AND CASE REPORTS.

Tetanus.

By W. Brown, M.R.C.V.S., Worksop.

In perusing Wallis Hoare's *System of Veterinary Medicine*, I notice the following: "An attack of tetanus does not confer immunity, although second attacks are very uncommon."

Having recently lost an animal from its third attack, I think it would interest others if the case were recorded.

Two years ago a pit pony was found suffering from tetanus in a somewhat acute form, and I formed the opinion that it was the result of a wound in the coronet. He made a recovery in several weeks' time and was sent down the pit to work again.

Ten months since, as a result of an accident, he suffered from a large wound inflicted by the end of a broken shaft which penetrated completely the abdominal wall. Deep, soft, thick sutures were put into the abdominal wall and the outer skin similarly treated, but with finer silk, and the stitches were not so tight or close—thus, provision was made for drainage.

Four weeks after the accident, tetanus developed and its appearance seemed to denote a rapid termination; but he survived the ninth day—which, in my opinion, is the critical one with those surviving the first forty-eight hours, and in ten weeks from the accident the pony was turned out to grass.

A short time ago he was again sent down the pit, but had not been there long before he was once more suffering from tetanus—this time, unfortunately, being worse than on previous occasions. He died on the third day.

Dual Breed Conception and Uterine Rupture.

By H. W. Carbury, M.R.C.V.S., New Zealand.

Subject.—Eighteen months old. Holstein heifer due to calve. In appearance the heifer looked more like a barrel on four props than anything else. Temperature sub-normal (95°) and running down pulse. Complete absence of peristaltic action. *Os uteri* firmly closed. I advised destruction, but the animal died within a few hours.

Post-mortem.—This showed a rupture in the womb about six inches long, and a number of blood clots in abdominal cavity. The uterus was an enormous size and thin walled, and contained twin calves, fully developed. One calf was a typical Shorthorn, and the other a Holstein.

This heifer had been running with two bulls of breeds corresponding to the calves. None of the fœtal fluids had escaped from the uterus, but hydrops amnii was more marked than in any previous cases experienced.

ABSTRACTS.

[Contribution à l'étude et an traitment chirurgical du phlegmon chronique du garrot du cheval. (Contribution to the study and surgical treatment of chronic phlegmon of the horse's withers) by Parvulescu, M., *Recueil de Medicine Vétérinaire.* Vol. C. No. 16. pp. 419-422.]

The author substitutes the expression "chronic phlegmon of the withers" for the familiar denomination "fistulous withers." He considers the substituted phrase to be more precise and rational than the replaced one.

The greatest importance is attached to the distribution of connective tissue in the region of the withers, the shoulder, and the neck. Diffusion of pus, as well as formation of fistulæ, bears a distinct relation to the denseness or looseness of this tissue. Pockets or "conjunctive spaces" form between the connective tissue and other tissues of the regions, and in order to enable the surgeon to proceed with operative methods, the author divides the entire seat of injury into several topographic areas. These are: (1) *Predorsal space.* Above and in front of the anterior border of the shoulder, at the same level as the second dorsal transverse process. Only a small amount of very loose connective tissue is found here. (2) *Supra-scapular space.* Bounded and limited by the superficial muscles of the shoulder. It corresponds to the summit of the shoulder. (3) *Prescapular space.* A vast pocket lying in front of the shoulder. It is limited inferiorly by the mastoido-humeralis, posteriorly by the angle between the scapula and the humerus, and anteriorly by the thoracic extremity of muscles occupying the inferior portion of the neck. (4) *Superior sub-scapular space,* which lies beneath the scapula and is circumscribed by neighbouring muscles. (5) *Inferior sub-scapular space.* Lies behind the elbow and a little distance above the spur vein. (6) *Cervical space,* which is found a few centimetres behind the point of union of the middle and inferior thirds of the neck.

From a surgical point of view the first consideration is the location of the necrotic area. Once this is removed, a fresh difficulty presents itself. Owing to the configuration of the withers and shoulders, together with the diversity of the constitutive elements of the region, it is no easy matter to make adequate provision for drainage. When the lesion lies superficially at or near the withers, the large median incision is recommended. This procedure is, however, of no avail when the injury is deep-seated or situated at a distance from the spinal column. In the latter case the author operates in the following manner. A circular incision is made on either side of the withers, in such a way that a healthy portion of skin is left between them. The skin is removed, and care taken to preserve the connective tissue. The fistula is followed to its lowest end, its wall is dissected out, and the necrotic area extirpated. The surgeon breaks down all artificial adherences caused by

inflammatory reaction among the tissues around the seat of the operation.

Drainage tubes are inserted, and the wound closed by interrupted sutures placed at short intervals.

Derris as an insecticide.

Various species of *Deguelia* (Derris) occurring in the Philippines have been tested by H. E. Woodworth for their insecticidal properties, and experiments with extracts from the dried roots of one species (probably *D. elliptica*) were made with guinea pigs by subcutaneous abdominal injections.

These indicate a very slight susceptibility to the action of the poison, as even the smallest amounts used were in excess of that which would be absorbed by light dustings.

A commercial extract of 16 per cent. concentration, diluted 1 to 500 and added to water containing mosquitos, killed 65 per cent. of the larvae, but did not affect the pupae.

The powdered undiluted root sprinkled on the surface of the water killed 90 per cent. of the larvae in two to four hours.

Powdered root diluted to a 20 per cent. concentration with calcium carbonate, as well as commercial derris dusts, completely controlled the chicken lice, *Menopon biseriatum*, Piag., and *Goniocotes gigas*, Tasch., as well as *Gyropusovalis*, Nitzsch, and *Gliricola porcelli*, L., on guinea pigs.

Jl. Econ. Ent. xvii., No. 4, Geneva, N.Y. August 1924.

W.J.Y.

Sheep Scab: The Infectivity of Kraals.

Tests have been made that are held to have proved conclusively that a sheep kraal infested with the causal agent of sheep scab (*Psoroptes communis var. ovis*) if kept free from sheep for seventeen days, will no longer be able to infect sheep. It was also found that an infested kraal was unable to re-infest a number of sheep that had been suffering from scab, had then been dipped twice at nine days' interval, and immediately returned to the infested kraal. The policy of dipping is therefore vindicated.

9th and 10th Reports, Dir. Vet. Educ. and Res., Union S. Africa, 1923. Pretoria, 1924.

W.J.Y.

The Denbighshire County Council, at their last meeting, resolved to have samples of milk examined bacteriologically for the presence of tubercle bacilli, and Dr. Grace, Bacteriologist Royal Infirmary, Chester, was appointed to carry out the work.

DIVISIONAL REPORT.

Southern Counties Division.

MEETING AT WINCHESTER.*

A meeting of this division was held on Wednesday, November 5th, at Dumper's Restaurant, Winchester, when the President (Mr. E. Whitley Baker, of Wimborne) presided, and the others who signed the attendance book included Messrs. W. Caudwell (Bournemouth), H. Eadie (Southampton), John Facer (Southampton), E. S. Martin (Christchurch), A. J. Moffatt (Isle of Wight), C. Pack (Lymington), and J. S. Wood (Parkstone), H. C. Rockett (Salisbury), together with Captain R. Daubney, of the Ministry of Agriculture and Fisheries (who gave an extremely interesting lantern demonstration on some worm diseases in sheep, pigs and horses), and Miss A. Cust.

The minutes of the previous meeting, as published in the *Veterinary Record*, were taken as read and confirmed.

The PRESIDENT said he should like to say, before proceeding with the business of the meeting, how delighted they all were to have Miss Cust among them. He believed she was welcomed by an old colleague of his and one of his greatest friends in the profession, Mr. Henry Sumner, soon after she qualified, and he could only repeat what the latter said on that occasion and assure her that his own gratification at her presence was equal to his, and that they did welcome her most heartily that afternoon.

Miss CUST, in suitable terms, acknowledged the compliment.

Letters of regret at inability to be present were announced by the Honorary Secretary, Mr. Facer, from Mr. G. P. Male, of Reading; Major Simpson, of Maidenhead; Mr. Samson, of Mitcham; Mr. H. Redford, of Winchester; Mr. G. W. Bloxsome, of Hove; Mr. Ripley, of Hythe; Mr. J. W. McIntosh, of London; and their host of that afternoon, Mr. J. B. Tutt.

Nomination.—Mr. FACER proposed the name of Mr. G. N. Gould, of Southampton. The PRESIDENT seconded and the nomination was approved.

On the suggestion of Mr. EDIE it was decided to defer the election of three representatives on the Council, to act with himself as Secretary, to the annual meeting next March.

The PRESIDENT next asked for the opinion of the members on a resolution which had been passed by the Western Counties Society in the following terms:

"That the time has arrived when veterinary surgeons should be paid an adequate fee for their duties at dog shows."

Major WOOD remarked that, as far as dog shows were concerned, he thought it was up to them as a profession to give them all the help they could. The fee they would be offered would probably be a very small one for the work there was to do, and in return there would be a sort of obligation on them to put in

* Received on November 24th.

the whole day at the shows. He thought they were in a very much better position, as they were now giving their services voluntarily whenever they could. Personally, he should not be in favour of the resolution.

Mr. FACER remarked that he was quite in agreement with Major Wood. There were very few directions in which veterinary surgeons could give their services. The medical profession gave their services to the hospitals without any suggestion of a fee, and it seemed to him that this was one of those things in which they could give their services in a honorary capacity and with a good heart, and help people where they could.

Mr. CAUDWELL thought this raised an important point. The office was rather an unthankful one and personally he thought it was more or less a farce. Of course, they must have veterinary surgeons to inspect the dogs, but seeing the number of dogs that had to pass through their hands at some shows he was quite positive many of them could undergo very little examination. He did not see how it was possible to make a thorough examination of every dog that entered a show, and he did not think anything would be gained by trying to extract a fee. They would probably dispense with their services altogether. On the other hand, if those who did the work thought they were deserving of a fee they were quite at liberty to ask for it.

The PRESIDENT said he would like to move that the members of their division were in favour of things remaining as they were. At the present time they were able to do very little gratuitous work, and personally he should be very sorry for the public to think that he expected to be paid for everything he did for the community at large.

Major WOOD seconded, and this was agreed to unanimously.

THE PRESIDENT'S ADDRESS.

The next business on the agenda was the President's address, and on rising to give this, Mr. WHITLEY BAKER said he should like again to express his pleasure at having a lady member of their profession present with them that afternoon. Might he also be allowed to say how pleased he was that a member of their Society and a man he had known almost ever since he had been a member of the profession, Mr. Slocock, was now President of the Royal College. (Applause.) Mr. Slocock had been a frequent attendant at their meetings in the past and with their permission he would like to suggest that their Honorary Secretary write on their behalf and convey their congratulations together with their best wishes for a successful term of office. There was also another member of their Society to whom he thought they must offer their congratulations, and that was their old friend Major Simpson, who had just been elected President of the Central Division. They must all feel pleased that his services to a Society with which he had been connected for a good many years now should have been recognised by placing him in the proud position of being its President. (Applause.)

Proceeding, the President said he was very sorry that that meeting, which should have been held in June, had had to be unavoidably postponed for so long, and he was afraid he must to a large extent acknowledge being the guilty party. Their energetic Secretary, Mr. Facer, had done his very best to procure papers, lectures and operations in order to ensure a successful gathering, and he hoped their meeting that afternoon would prove that he had succeeded, and that the demonstration to be given by Captain Daubney would not only be gratefully received, but would secure a full and beneficial discussion. Poultry disease was daily becoming more important to the veterinary surgeon, and he could not sufficiently express his appreciation of the lecturer's kindness in coming there to give them the benefit of his knowledge and investigations. His Presidential Address would, he feared, not be so great a success, but with their kind indulgence he proposed touching upon a few matters which, in his humble opinion, required their due consideration, and their views upon which he asked them to express freely and fully.

First might he commend to their thoughts and charitable feelings the need and objects of their own Victoria Benevolent Fund, and might he say that he thought it spoke badly for them that the last annual report of this excellent institution should have contained these words:—"Applications are being constantly received, but the funds at the disposal of the Council permit of no grants being made." This ought not to be, and he would ask those who, like himself, subscribed, say, 10s. 6d. per annum, to double their subscription and those who did not subscribe anything to start at once and help their confrères who had fallen on ill times, as well as the dependants of deceased members.

The Tuberculosis Order which, during the war, was formally shelved, would now, he doubted not, effect a much needed reduction in this fell disease in man and animals, and he would suggest that they formally pass a resolution at that meeting asking for the re-introduction of the Order. Probably now that they had, or would have, a strong Government in power, it might be well for each member of their Society, nay, each member of their profession, to approach his local Parliamentary representative and request him to use his influence with the Government on the subject; and, in considering this matter, it appeared to him to be an imperative necessity that the sale of tuberculin to others than members of the veterinary profession should be prohibited, as otherwise they would be heavily handicapped in their diagnosis, bringing possibly loss to their clients and reflection on themselves. It would seem impossible to have two opinions as to the necessity of standardisation of this product and, further, he would suggest that the sale of any tuberculin not standardised should be deemed a misdemeanour, and the culprit made subject to prosecution and a fine, if not imprisonment. In England it was now provided that no person should *knowingly* sell or expose for sale the milk from a cow suffering from tubercular disease of the udder. Yet Dr. Howarth, of London,

had stated that 50 per cent. of the samples of milk subjected to examination by him contained the bacillus. The outcry for a clean milk supply had at last brought an Act into force which, in part at least, was ensuring for the public a more attractive and healthy milk for infants and adults, but there was yet much to be done ere an ideal milk was secured. The condition of some cowsheds, and the manner in which the milk was drawn from filthy, unwashed udders, to say nothing of the condition of the floors in many of the cow-houses, was nothing but a scandal, and constituted a serious reflection on them as a nation for the manner in which they neglected the most essential and hygienic regulations. He frequently visited one large dairy where the floors had no straw upon them and the cows lay on the bare floors covered with dung and other filth, the walls of which were splashed with excreta. It was quite time Medical Officers of Health, who were supposed to inspect these buildings, should have in all cases the advice and help of their professional veterinary colleagues. Judging from a paper by Mr. E. A. Kendall, B.V.Sc., in the *Veterinary Record* last May, matters were arranged better in Victoria (Australia) where the veterinary staff rightly assumed a main controlling power.

Perhaps this matter of collaboration might be followed by a reference to the question of etiquette in their own profession. Was there amongst them that proper *esprit de corps* which should exist? Personally, he had very little cause to complain of the treatment accorded by his fellow practitioners, but in reading the reports of police court cases one was prone to wonder if it was due to ignorance or want of honest, gentlemanly conduct that they had such opposing opinions given. He might be wrong, but he thought, as far as possible, whenever a colleague was called upon to express an opinion on the diagnosis of a professional brother he should, before doing so, insist upon a personal interview with him. The public would not think less of them when they could show them they could and would act together. They could not help noticing the diametrically opposed opinions given in cases connected with the R.S.P.C.A., whose objects were, or should be, excellent, and whose work done for the alleviation of pain and the securing of proper treatment of the horses employed in the war was beyond all praise, but the attitude of whose inspectors was often objectionable in and out of Court and whose word was often taken by some magistrates before that of the veterinary surgeon. He ventured to express the opinion that no magistrate should convict on the evidence of these inspectors in cases of lameness without the support of veterinary evidence. He hoped there was not a member of their profession who was not opposed to cruelty nor one who would not support a society for its prevention, but he did think prevention, not punishment, should be its watchword, and that it would be well for the inspectors to be advised by their Society that this was its great desire and object.

It must be a source of great satisfaction to Sir Stewart Stockman, the President went on to say, to see how the members of his own profession had supported him in the steps he had taken for the stamping out of foot-and-mouth disease, and he was sure he was speaking for them all when he said they wished him every success in his further endeavours and investigations. He had personally to express his full appreciation of the treatment accorded himself by the Ministry when he notified some pigs which were eventually certified as suffering from this disease and which proved to be the first outbreak in Dorset for the year. No man could have received more prompt help or more kind treatment from one and all, especially from Mr. Holman Berry, who was ever a "very present help in trouble." He would also like to be the mouthpiece of the Southern Counties Division in expressing their fullest congratulations upon the success of the National Association's meetings at Aberdeen. He would fain have been among those who went north, but circumstances prevented him, and he could and did but bewail his loss. Whilst upon the subject of the "National," might he hope that he voiced the opinion of the Southern Counties when he said they felt the work of the Association was of the greatest help to the veterinary profession and that they were deeply grateful to the Association for the invaluable work they were doing, and not the least did they value the work of the strenuous Secretary, Mr. Livesey. They must all feel proud, too, to know that, mainly through the efforts of Sir John M'Fadyean, the foundation stone of the Research Laboratory was laid at Camden Town by H.R.H. the Duke of Connaught last May. Equally glad were they to have evidence that His Majesty's Government were granting substantial aid to veterinary and agricultural investigation.

A question had arisen as to whether professional papers should advertise quack remedies. Undoubtedly no, both for the good of the public and the reputation of the medical and veterinary professions. Out of this there arose at once the question—What was a "quack" remedy?

He was pleased to see that the Distemper Research Fund was growing, but had they, as veterinarians, sufficiently supported it, and ought they not each individually to send their mite?

He would also ask them to think over, and express their opinions upon, their duty as to standardisation of inspectors' fees. In his district they were wretchedly inadequate; but what was the proper attitude for them to take up—to refuse them, or to consider the needs of the district? In either case one was bound to be the loser. If time permitted, he would like those members who were local inspectors in their districts to give him and the division an account of the methods they adopted in carrying out their duties in the local markets, etc. Finally, there was a question which might well be the subject of a paper in itself, but which he felt he would like to see ventilated, namely the efficacy of anti-abortion vaccine. He would like the opinion of others, but his own, briefly, was that the question might undoubtedly be answered in the affirmative.

Following on his address, the President remarked that he would like to move from the chair that that Society was of opinion that the Tuberculosis Order should be re-introduced at the earliest possible moment, and that a copy of this resolution be forwarded to the National Veterinary Medical Association with a view to their approaching the proper Government Departments.

Mr. CAUDWELL seconded.

Mr. MOFFATT remarked that it was a curious thing, but the Order had been in force in Ireland since 1919. How was it that it was not in force in this country?

The PRESIDENT: We have had a Labour Government in power for part of that time. But, seriously, I quite agree that it ought to have been in force here.

Major WOOD asked the President if he wished to see the Order re-introduced in its original form, adding that he took it he was not altogether satisfied with that.

The PRESIDENT: No, certainly I was not.

Major WOOD: The question that occurred to me was whether we could not try and get it improved in many ways. The original Order was administered by the Medical Officers of Health.

The PRESIDENT: Yes, that was so.

Major WOOD: The question is, whether we should not try to get that Order so amended that all dairy cattle should be inspected by a veterinary surgeon.

The PRESIDENT said he quite agreed that there were many defects in the original Order, but his own feeling was that if some one did not make a start they would not get much further.

Captain DAUBNEY said it might interest them to know that when he was in the States he had quite a lot to do with this matter, and since visiting the States and Canada and comparing the conditions there with those that obtained here in England, he had formed a strong opinion that some work more of a constructive nature was necessary on the part of their profession and perhaps on the part of the Ministry as well. He thought their livestock industry depended first and foremost upon the exportation of pedigree stock, and he believed it would also be agreed that their best customer was America, either North or South. In the States and in Canada they had a system whereby the Government gave a Government seal of freedom from tuberculosis on herds that complied with the necessary conditions, and there was a reciprocal arrangement between the States and Canada under which cattle from a certified herd in the one country was accepted by the other without any further testing. At the Chicago Livestock Fair of 1920, he was talking to the President of the Canadian Livestock Association and the President of the United States Association within a quarter of an hour of each other, and they both raised this question of legislation in England, and asked whether we were not going to take any legislative steps towards building up tubercle-free herds in this country. It was frequently the experience of importers from this country that animals which passed the tests in this country reacted, not immediately on arrival, but to the second test, which was performed after an interval of sixty days; and very often a man who had taken the trouble to come to England to buy cattle found, when he got his cattle over there, that many of them failed on the sixty days' re-test. This was no reflection on our testing here; it simply meant that the animals were about to become infected or had recently become infected when they were tested here. The result was that a man, after this experience, preferred to buy locally in future. They realised over there that, with infection so heavy as it was here, it was going to be a very hard task to build up tubercle-free herds, but he did not know that it was impossible. The stimulus must come from the profession over here, and he believed it to be quite possible for the profession, through its publicity campaign, and through each member exercising his own individual influence in his own particular district, to persuade the Ministry of Agriculture to put some scheme on foot, which would have to be voluntary at first but which would eventually enable a man to receive a Government certificate that his herd was free. He felt himself that some such scheme which would have tubercle-free herds as its end had a great deal to commend it. This was only a bald idea of his own, but it did seem to be worth consideration. It would have to be essentially a voluntary work in the first place, because there could be no compulsion, but when once the efforts of their profession had succeeded in building up, say, a dozen tubercle-free herds of repute in the country, the Government would be able to give its certificate, and other people would find they could not afford to remain out.

The PRESIDENT asked if the States gave any financial aid.

Captain DAUBNEY: Yes, in the United States all reactors are slaughtered and the Federal Government pay half the compensation and the State Government the other half. The testing is done free, part of the cost being born by the State and part by the Federal Government. A small staff is employed by the Federal Government to run the business, and they employ largely the services of local veterinarians.

The PRESIDENT: That seems to be the whole trouble over here—we do not get State aid.

Mr. PACK said, as far as he could remember, the 1913 Order was run on those lines, and he thought it was one of the best means of eventually producing tubercle-free herds.

Captain DAUBNEY: But you only took the obviously diseased animals in the 1913 Order. I was speaking more of an educational and propaganda movement towards the building up of tubercle-free herds.

Replying to a question by Mr. CAUDWELL, Captain Daubney said no animal was admitted to a certified free herd unless it was subjected to repeated tests, but after the second test the percentage which showed reaction was very small.

Eventually the resolution was amended to the following:—

"That we, the members of the Southern Counties Veterinary Society, consider that steps should be taken to press for a re-introduction of the Tuberculosis Order on lines to be approved by the profession and with a view to the building up of tubercle-free herds which could receive a Government certificate."

The HON. SECRETARY asked for instructions as to the place of the next meeting, which would probably be held in December, and suggested that, as Mr. SCOTT, of Bridgwater, had promised to come and talk to them on some aspects of immunology, it was perhaps only due to him that they should study his convenience as far as possible.

The PRESIDENT suggested Salisbury, and this was seconded by Mr. PACK and carried.

Tea was afterwards partaken of at the invitation of Mr. Tutt, and the President took advantage of this to propose that they place on record their hearty thanks to Captain Daubney for the most interesting and instructive demonstration he had given them that afternoon. He was sure they all felt, with him, that they had learnt a lot, and what had particularly appealed to him was the free and easy manner in which Captain Daubney had dealt with his subject.

Mr. PACK had very great pleasure in seconding. It was the first time he had had the pleasure of listening to Captain Daubney, but he sincerely trusted it would not be by any means the last.

The proposition was at once carried by acclamation.

JOHN FACER, *Hon. Secretary.*

The R.A.V.C. Old Comrades Dinner.

For many members of our profession special interest attached to Friday, November 28th, for on that date the fourth annual Reunion Dinner of the R.A.V.C. Old Comrades' Association was held at Anderton's Hotel, Fleet Street.

The gathering proved to be a large and successful one, over 200 members being present. Goodwill and comradeship were very much in evidence and, combining with the musical efforts of the band, lent an air of festivity to the occasion.

The President in his toast, "The Association," said that the membership had now reached the total of 850, and that there were at present three branches—Chelsea, Liverpool and Glasgow—all doing good work; but they must not be satisfied with this or allow the Association to fall into decay. If every member would endeavour to secure at least 10 new members, and help in every possible way the four new county branches which it was proposed to form, they would have attained the success they desired. The Association was not asking for money, although the subscription was relatively small, being only 1s. per annum. There was no other Association doing such good work as they were doing on such a small subscription.

In conclusion, the President asked everyone present to contribute to the success of the Association. He

(Continued at foot of next column.)

NOTES AND NEWS.

The Editor will be glad to receive items of professional interest in these columns.

Diary of Events.

Dec. 18th—Meeting of the Southern Counties Division at Salisbury.

Dec. 23rd—Confirmatory General Meeting of the Association.

1925.

Jan. 1st—Nominations for election to Council R.C.V.S.

Jan. 7th—Foreign Voting Papers R.C.V.S. issued.

Jan. 7th—R.C.V.S. Examination Committee, 2 p.m.

Jan. 8th—R.C.V.S. Committee Meetings, 11 a.m. to 1 p.m., 2 p.m. to 5 p.m.
Victoria Veterinary Benevolent Fund Council, 5 p.m.

Jan. 9th—Publication Committee R.C.V.S., 11 a.m.
Finance Committee R.C.V.S., 12 noon.
R.C.V.S. Council Meeting, 2 p.m.
R.C.V.S. Special Council Meeting, 3-30 p.m.

Jan 22nd—R.C.V.S. Special Council Meeting (probable date).

Royal College of Veterinary Surgeons.

DIPLOMA IN VETERINARY STATE MEDICINE.

An Examination for the D.V.S.M., was held at the Royal (Dick) Veterinary College, Edinburgh, on November 28th, 29th, December 1st and 2nd, and at the Royal Veterinary College, London, on November 28th, 29th, and December 4th, when seven candidates entered.

The following were successful in obtaining the Diploma: R. C. U. Fisher, Edinburgh; T. M. Doyle, London; A. A. Forsyth, London; and H. C. Gregory, London.

FRED BULLOCK, *Secretary.*

(Continued from previous column.)

coupled with the toast the name of a venerable and honoured soldier, Colonel Walters.

Colonel Walters, being requested to make a speech, said that he was very grateful for the identifying of his name with the toast proposed by the President, and the response made. Making reference to the fact that he had joined the army in 1861 and had seen service in many parts of the world, and was now 86 years of age, Colonel Walters asserted that the R.A.V.C. Old Comrades' Association was undoubtedly the finest of its kind, and he would be pleased to do what he could to assist the Association.

In his cartoon on the menu card, Sergeant O'Reilly made good use of the fact that the War Office is publishing *The Official History of the R. A. V.C.*, which will probably be of great interest to all those who have served, or are serving, in the Corps.

The Viability of the Bovine Tubercle Bacillus.

At the Annual Meeting of the Royal Counties Division on Friday, November 28th, a letter, which will be given in our report of the proceedings of the meeting, was received from the National Institute for Research in Dairying.

For some years the Institute has been conducting researches of particular value to the veterinary profession on the viability of the bovine tubercle bacillus. In order that those researches may be continued, the Institute desires to purchase a cow suffering from tuberculosis of the udder, excreting tubercle bacilli in her milk, which must otherwise appear normal. The cow should be in good general condition, and likely to live for some months. If any of our readers should encounter such a cow, the Institute would esteem it a great favour if they would kindly communicate with them. The Institute will be pleased to supply sterile bottles for the taking of the samples of suspected milk which should be forwarded to the National Institute for Research in Dairying, Shinfield, Reading, for examination, after which they can arrange, if necessary, directly with the farmer, for the purchase of the cow, if the veterinary surgeon approves of this course.

Royal (Dick) Veterinary College Centenary Fellowship.

It will interest many of our readers to learn that a Trust Deed relative to the above Fellowship, has now been signed, with Lord Forteviot, Dr. T. G. Nasmyth, Major A. Baird, Mr. Harry Rawson, and the Principal of the College named as first Trustees. Provision has been made for the election, as occasion arises, of representatives of Veterinary Science, Agriculture and Education as successors to the first Trustees, and safeguards have been set up to prevent the diversion of the Fund to any purpose other than that for which it was originally intended.

The amount of the Fund, after the deduction of all expenses, at present stands at £5,803, but this is not to be taken as the final figure, for the Trustees will endeavour to add to it as opportunity affords.

The Committee wish to express their grateful thanks to the many members of the veterinary profession whose kindness has enabled the Fellowship Fund to be established.

The forthcoming departure from his native town of Mold of Mr. E. P. Edwards, M.R.C.V.S., is viewed by his many friends there with a regret which is intensified by the knowledge of the fact that this step is being taken owing to indifferent health. Mr. Edwards is one of the few remaining in Mold of the "old boys" of Drury's School in New Street. He completed his education at the Liverpool Institute, and was originally intended to follow the business of a chemist, to which he served an apprenticeship in Liverpool. He passed with ease the examinations of the British Pharmaceutical Society, but finding insufficient scope in the avocation selected for his energies and abilities, he proceeded to the Royal Veterinary College at Edinburgh, emerging from that institution with distinction. He established and developed an important practice as a veterinary surgeon at Mold, his activities covering a wide area. It is hoped that complete restoration to health may follow the change of environment on which he has decided.

The Annual Report presented to the Liverpool University Court, held on November 28th, states that among the more notable gifts received by the University during the past year is a sum of £20,000, under the will of the late Mr. William Prescott, for the endowment of a Chair in the School of Veterinary Medicine, to be called "The William Prescott Chair of the Care of Animals—Causation and Prevention of Disease."

In the "Contents" of page iii. of the *Veterinary Record* November 29th, 1924, the name of Mr. L. P. Pugh was inadvertently omitted as one of the authors of the article "Enzootic Jaundice (Yellows) in Dogs," published in that number. We also regret that Mr. Pugh's name was omitted from the reference to the authors made in the Editorial.

CORRESPONDENCE.

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.
All correspondence must bear the name and address of the contributor for publication
The Editor does not hold himself responsible for the opinions of his correspondents.

The Etiology of Milk Fever.

To the Editor of The Veterinary Record.

Sir,—In your last issue, Mr. R. H. Smythe takes me to task for various statements in my paper on the etiology of milk fever. His letter is one that invites a detailed reply, and I feel indebted to him for opening discussion on the subject. I will take his propositions *seriatim*.

He appears to encounter milk fever before labour in as many as 20 per cent. of cases, and with considerable frequency at other times remote from labour, even in barren cows. My statement that it generally occurs about the time of parturition he seems to regard as one of the "facts taken for granted" to which he refers. I was, in fact, relying on the following quotation from Hutyra and Marek (page 849), with which my own experience accords: "Milk fever arises in connection with the birth and indeed in most cases within the first three days; sometimes however, somewhat later, or during or before parturition, yet never before the establishment of milk secretion." I may, perhaps venture to mention that in the course of fairly wide enquiring amongst veterinary surgeons and others I have never encountered any serious criticism of this quotation. It would be most interesting if we might have from him a detailed account of some of these anomalous cases, more especially those occurring in "dry" cows.

That milk fever should be ushered by in "partial or complete cessation of lactation," at least in very many cases, is undoubtedly true if milk fever be considered to start when staggering first appears. I have put forward the suggestion that unsteadiness and staggering are symptoms of intestinal auto-intoxication, dependent on an already existing condition *symptomatic of failure in liver metabolism* which has already reached an advanced stage. This failure will necessarily lead to a cessation of lactation, partial or otherwise, and there is nothing surprising in the fact that this failure should precede toxic symptoms. We know so little of the exact mechanism by which the latter are ordinarily checked that we are not even entitled to be surprised that in some cases this check only ceases to function "a few days" after the ketosis is already established, and with it the drop in milk supply. I need only quote such an authority as Wallis Hoare (page 1372) to shew that the act of removal of milk from the udder predisposes to, or rather precipitates, an attack of milk fever.

I cannot agree that the high butter-fat percentage cows should be expected to deal best with the extra load entailed by lactation. In these, the liver fat-transforming function is already strained to the uttermost, and they succumb to an extra load which is evidently intended by nature to be well within the range of liver function of the normal cow.

I am surprised that Mr. Smythe does not consider a restricted diet during the last days of pregnancy to be of any use. I had supposed that the partial efficiency of such restriction was generally recognised—just as much as a liberal or rich diet at the same period acts as a predisposing factor.

Mr. Smythe makes a point of the fact that withdrawal of a pint of milk, and injection of half-a-pint of water suffices to cure, in fact, "cures even when the total volume injected is less than that of the milk withdrawn." I do not deny that some cases so treated recover, but it is not evident that they did not do so in spite of this treatment rather than because of it. In any case, the proof of the matter may be submitted to the test of Mr. Smythe's practice. Does he or does he not habitually use this cheap and simple method, and, if not, why not? From his reference to the effects of inflation, I suspect that he cannot conveniently answer this query.

I quite agree that inflation of two quarters may be sufficient. I have suggested that inflation operates by satisfying the demand for milk created by an empty udder. This obviously states *in very general terms* a theory which our present knowledge hardly allows us to define more precisely. It is certain that the udder can only communicate its needs (or their satisfaction) to the liver *via* the nervous system or the blood stream. Perhaps reflexes are at work, perhaps hormones, perhaps both. But whichever it be, there is no particular reason to suppose that inflation of two quarters should not in some cases provide sufficient stimulus to the liver metabolism, to deal with fats, and to carry on its normal detoxicating functions again.

I admit freely that much more information will be required before the theory I have suggested can be fully substantiated. But its accordance with the clinical findings in connection with this disease is so close that I feel justified in claiming that it is, in broad outline, as close an approximation to the truth as has yet been forthcoming.—Yours faithfully, L. P. PUGH.

Sevenoaks,
6th December, 1924.

The Veterinary Inspectors' Section of the Royal Sanitary Institute Congress.

TO THE EDITOR OF THE VETERINARY RECORD.

Sir,—Veterinary Delegates are now about to be appointed for the next Congress of the Royal Sanitary Institute, to be held in Edinburgh. As I am in agreement with you that the Veterinary Section of the Congress held at Liverpool last July was far from satisfactory to the veterinary profession, I put forward the following suggestions for the consideration of Veterinary Inspectors and others interested in Milk and Meat Inspection:—

(1) Efforts should be made to get as strong represen tation of Veterinary Inspectors on the Council of the Royal Sanitary Institute as possible.

(2) A Committee of Veterinary Delegates to the Congress should be formed to draw up a programme for the Veterinary Section, care being taken not to overload the programme as was the case, in my opinion, at Liverpool. I suggest that such a Committee should meet the evening before one of the Institute's Meat Examinations in a central town in England, such as Birmingham, Leeds or Manchester. Examinations at all these centres will probably be held previous to May, 1925.

(3) Having fixed upon the programme for the Veterinary Section, this Committee should meet daily during the course of the Congress, and particularly on each day previous to the meetings of the Veterinary Section, when arrangements could be made with the President of the Section for the conduct of the meeting and the names of Veterinary Inspectors supplied to him with the order in which these should join in the discussion, and should frame any Resolutions which, in the opinion of the Committee, should be moved at the meetings.

Yours faithfully, J. S. LLOYD, Chief Veterinary Inspector.
Sanitary Authority,
Town Hall, Sheffield.
8th December, 1924.

The Editor acknowledges the receipt of the following:—

Communications from Major F. T. G. Hobday, Captain W. Wallace Kerr, Messrs. L. W. Wynn Lloyd, E. McSwiney and G. J. Roberts.

Report of October meeting of the Lancashire Division, from Mr. John Spruell, Hon. Secretary.

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"New York Medical Journal and Medical Record," April 18th, 1923.

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Glos., *July 18th*, 1924. — — ———, F.R.C.V.S.

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